DOCUMENT RESUME

ED 163 083 TM 008 061

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TITLE Should Jose Be Tested In Spanish?
PUB DATE Apr 77
CONTRACT 100-76-0136
NOTE 33p.; Paper presented at the Annual Meeting of the National Council on Measurement in Education (New York, New York, April, 1977)

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS Academic Achievement; Aptitude Tests; Bilingual Students; *Language of Instruction; *Language Proficiency; Language Role; Preschool Education; *Preschool Tests; *Response Style (Tests); Screening Tests; Spanish; *Spanish Speaking; *Test Construction; Testing
IDENTIFIERS Bilingual Syntax Measure; *Circo Assessment Battery

ABSTRACT

To prepare for the national norming of El Circo (the Spanish-language equivalent of the Circus Assessment Battery) three research questions were posed. First, will the presentation of test instructions in both English and Spanish significantly increase achievement? Second, what level of language competency is necessary for valid use of the various tests on nonlanguage skills in the El Circo battery? Third, how can this competency be assessed? Three El Circo tests, representing low, intermediate, and high requirements for understanding test instructions and responding appropriately were given to 154 Spanish speaking or Spanish surnamed preschoolers. Results indicated both languages should not be used for test instructions because there was no significant difference in achievement between groups assigned to this treatment and groups receiving instruction in the dominant language alone. The influence of language competency increased with the quantity of verbal instructions for the test. Prescreening to identify children with insufficient Spanish to benefit from El Circo was recommended. The Bilingual Syntax Measure and the El Circo Language Check were validated in this study for prescreening. Although parent and teacher assessments were also considered, neither added much to the accuracy of the screening. (CP)

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Should José Be Tested in Spanish?

Roy Hardy

Educational Testing Service

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Presented to
National Council on Measurement in Education
New York City
April, 1977

Running Head: Should José Be Tested in Spanish?

TM008061

Abstract

This study investigates the interaction effects of the language competencies of young children, the language used for test instructions, and the quantity of test instructions on achievement in nonlanguage skill areas. Results indicate that the interference of a test presented in a language in which the child is not competent increases with the quantity of test instructions.

Combination treatments presenting test instructions in both Spanish and English resulted in achievement not significantly different from instructions in the dominant language alone. The study also compares four methods of assessing children's language competency and validates an operational definition of "Spanish speaking" used in the national norming of the El CIRCO test battery.

Should José Be Tested in Spanish?

The sad history of the misuse of tests administered in English to Spanish-speaking children is well-documented (Zirkel, 1975; Palomores and Johnson, 1966; and Carter, 1970). This misuse is due, in part, to a lack of appropriate tests in Spanish (Bernal, 1975). With the El CIRCO series, ETS, under contract to the Administration for Children, Youth, and Families, has attempted to fill this void of cognitive tests for preschool Spanish-speaking children. The availability of tests in Spanish introduces the possibility of a reverse misuse; i.e., the testing of English-speaking children with tests administered in Spanish. Although on the surface such a misuse may appear unlikely, there are many young children in bilingual programs in the U. S. with names like Garcia, Hernandez, and Rodriguez who have been raised by English-speaking parents and know no Spanish.

For tests which are not primarily tests of language ability, one goal should be, as much as possible, to remove the influence of language from the test results. Influence of language can be reduced, but not eliminated through test design. Short, simple instructions, relatively few item types, and the use of nonverbal item types will all logically reduce language dependence. However, for some concepts, nonverbal item types are nearly impossible and virtually all tasks require some verbal instructions. Therefore, for most children and most tests, a decision must be made as to what language should be used for test instructions. Should José (Juanita or Joe) be tested in Spanish or in English?

For the monolingual child in a like monolingual environment, the decision

is relatively simple. But for the child in a bilingual environment, several factors and issues must be considered in making a decision to test in English or Spanish:

1. What are the language competencies of the child in Spanish and in English?
2. What level of language competency is necessary to essentially eliminate language influence on test scores for a given test?
3. Can the language competency of a child be quickly assessed and dichotomized for the decision to test in English or in Spanish?

In addition, it must be considered that perhaps the decision is not a dichotomous one. Some truly bilingual children might most validly be tested by some combination or mixture of the two languages if, in fact, they have only limited competencies in both languages.

For the El CIRCO test development project, these issues were critical. The original project plan called for the development of 11 instruments in Spanish to parallel tests in the CIRCUS series for English-speaking preschoolers.

In pilot administrations of the El CIRCO tests, it became evident that some of the Spanish-surnamed children in the sample would be more appropriately tested with instructions in English or, perhaps, with some combination of instructions in both Spanish and English. Moreover, the problem was much more evident in the tests from the series that had the greatest quantities of verbal instructions.

To establish standards for the norming administration of the tests and

guidelines for their eventual use, knowledge was needed as to the level of competency in Spanish required by the El CIRCO test instructions. The Advisory Committee for the project also recommended that the effect of dual instructions in Spanish and English be explored for various levels of language competency, and that parent or teacher reports of children language competencies be studied as possible alternatives or additions to direct testing.

With the norming of the El CIRCO tests scheduled for Fall '76, the planned research was, by necessity, limited to a relatively small sample size and short duration. A design and operational plan for the study was presented to the Advisory Committee in May, 1976. Data collection was scheduled for June-July, 1976. The major research questions to be addressed by the study were:

1. What level of language competency is necessary for valid use of the various tests on nonlanguage skills in the El CIRCO battery?
2. How can this competency be accurately and efficiently assessed?
3. Will the presentation of instructions in both English and Spanish significantly increase the achievement of a large proportion of the population of interest?

The basic design for the study was to isolate effects and interactions of 1) student language competencies in English and Spanish, 2) quantity of test instructions, and 3) language mode for test instructions. As a secondary goal, the study also compares four methods of assessing children's language competencies.

Sample and Test Sites

Because the study was to have implications for the eventual national norming of CIRCO tests, an attempt was made to represent all of the major geographical concentrations of Spanish-speaking populations. Seven sites were selected: New York, New York; Chicago, Illinois; Miami, Florida; San Antonio, Texas; Berkeley, California; Brownsville, Texas; and Albuquerque, New Mexico.

At each site, sample selection and testing were supervised by an ETS researcher trained specifically for this task. The project schedule required the study to be conducted during the summer months of 1976. Therefore, day care programs were chosen as the source of subjects. From the participating day care centers in each of the seven sites, a random sample of 14 males and 14 females was drawn from all enrolled Spanish-speaking or Spanish-surnamed children between 54 and 60 months old. The use of older children in the study was rejected to avoid ceiling effects evident in earlier pilot administrations of some of the CIRCO tests. Six children were randomly assigned to each of four treatment groups. Four children at each site were designated as alternates. Local teachers or center directors were questioned to ensure that the list from which samples were drawn represented the full range of Spanish competency levels attending at that site.

Five of the seven sites completed testing for 24 children each as planned. The Chicago field site completed testing for 14 children and the New York site completed testing for 20 children during the allotted time for the study. Analyses are based on a total n of 154 children from the seven locations. Due to absences on one of the three scheduled test days, three of the 154 children had only partially complete records.

Method

Children at each site were randomly assigned to one of four treatment groups prior to any investigation of their language competencies. Measures and procedures for assessing language competencies were, however, identical for all groups.

Measures of Language Competency

Since one of the purposes of the study was to investigate possible alternatives for measuring language competency, each child's language abilities were assessed by four methods:

1. Parent information
2. Teacher information
3. The Bilingual Syntax Measure (English and Spanish)
4. The El CIRCO Language Check

Information from parents was gathered through a questionnaire of seven items adapted from the recommendations of the Center for Applied Linguistics based upon their research related to the Measure of English Language Proficiency project. Items were printed in English and Spanish and were distributed with a form briefly describing the project and requesting permission to include the child in this study. In some locations, parents were contacted by the ETS examiner by telephone to prompt the return of the form.

The teacher information was based upon a questionnaire of seven items for each child parallel to the items of the parent questionnaire. Teacher questionnaires were presented in English only and were distributed to teachers by the examiners.

The Bilingual Syntax Measure was considered the principal criterion

measure of language proficiency for this study. The BSM is an individually administered test of productive language competencies using direct questions about a series of comical pictures. The BSM is in two parts. BSM-S is administered in Spanish and measures the progression of grammatical structures in that language. BSM-E is a measure of English competencies. The two parts use the same set of pictures, but different questions.

The BSM uses a sequential scoring scheme to arrive at one of five score level categories:

Level 1: No understanding - Children in level 1, except for a word here or there, have no receptive or productive skills in the language.

Level 2: Receptive language only - Children in level 2 can understand varying amounts of everyday language. They may repeat short sentences or questions, but cannot use the language to communicate their thoughts.

Level 3: Survival language - Level 3 children can usually make themselves understood by a combination of simple speech, gestures, and an occasional word from their native language.

Level 4: Intermediate language - Children in level 4 have little difficulty communicating their ideas in the language, but do not fully control some basic grammatical structures.

Level 5: Proficiency - Children in level 5 have native or near native proficiency in the language.

The Technical Handbook for the BSM reports test-retest weighted Kappa Coefficients of .62 for BSM-E and .64 for BSM-S with kindergarten, first- and second-grade children. 83.8% and 80.1% interrater agreements are reported for BSM-E and BSM-S respectively. In the present study a random sample of 51

BSM-E and 51 BSM-S were independently scored by a second rater with 81% and 76% agreement respectively.

The El CIRCO Language Check is a 16-item individually administered measure of comprehension of simple questions and commands presented in Spanish. Responses were scored for correctness or relevance to the question or command and for language mode used by the child. This test can be administered and scored in a much shorter time than the BSM and was proposed as a more time efficient means of identifying children with insufficient Spanish for benefitting from the El CIRCO test battery.

Dependent Variables

The dependent variables used in the study to assess the effect of various language modes for test instructions were scores on three tests from the El CIRCO series. The three tests were selected to represent three different levels of language content.

Test #3 - Parecidos (Look-alikes) is a measure of visual discrimination requiring the child to select from three choices the picture that is "like the picture at the top of the page." Only one item type is used and, through the use of examples and simple verbal instructions, language dependence of the items is minimal. Parecidos has 27 items and an estimated KR-20 reliability of .86 for the age group used in this study based upon prior pilot administrations.

Test #12 - Mira y Recuerda (See and Remember) is a measure of visual and auditory memory. Two item types are used and eight of the total 20 items require unique verbal instructions to the child. The KR-20 estimate of reliability for children under 60 months old in pilot administrations was .73.

Test #2 - Cuanto y Cuantos (How Much and How Many) is a measure of quantitative skills such as counting, the use of relational terms, and one-to-one correspondence. Cuanto y Cuantos uses only two basic item types, but each of the 40 items requires unique verbal instructions to the child. The estimated reliability of this test is $r = .84$.

Perhaps more important for this study than the psychological constructs measured by the three dependent variables is the range of language dependence of the three measures. Parecidos, Mira y Recuerda, and Cuanto y Cuantos represent low, intermediate, and high language requirements for understanding test instructions and responding appropriately. All three use a selected response format and require no productive language from the child. Prior to this study, the three tests were piloted with approximately 250 4-, 5-, and 6-year-old Spanish-speaking children and were reviewed by a Cultural Advisory Committee of Puerto Rican-, Cuban-, and Mexican-American educators.

Treatments

Each of the three dependent measures was administered to children in the study according to one of four treatments:

Treatment	
1	Instructions in English
2	Instructions in English followed by Spanish
3	Instructions in Spanish followed by English
4	Instructions in Spanish only

Children were randomly assigned to one of the four treatment groups prior to any testing. All measures were individually administered by trained bilingual examiners. Three 30-45 minute sessions at least one day apart

were required for each child. In the first session, the BSM-S and CIRCO Language Check were administered. In session two, the BSM-E, practice materials for the CIRCO measures, and Parecidos were administered. In session three, Mira y Recuerda and Cuanto y Cuantos were administered.

To avoid unnecessary frustrations for English monolinguals assigned to Spanish treatment or Spanish monolinguals assigned to English treatments, the examiners were instructed to terminate each test after five items if it was clear that the child could not understand the instructions.

Analyses

Two separate series of analyses were performed. The first series was designed to explore the relationships among language competencies of the child, language mode of test instructions (treatment), and language requirements of test content with test scores on the three CIRCO tests used as the dependent measures. A second series of analyses was designed to explore the relationships within and among the four measures of language competency used in the study.

For the first analyses, the Bilingual Syntax Measure was used as the principal criterion of language competency. The BSM was selected because of its wide use as a language dominance measure for young children and its independence from the El CIRCO series. Table 1 presents the bivariate distribution of obtained proficiency scores on the English and Spanish portions of the BSM for the study sample.

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Insert Table 1
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As expected, almost no cases were identified with low language competencies in both languages since, according to BSM interpretation guidelines, a child who by age four has not developed at least level 3 competency in one language would require special diagnosis and treatment. Since cell sample sizes in Table 1 are in several instances quite small, prior to investigating treatment effects, cells were collapsed to form three groups:

			Proficiency Levels	
Group	Description	N	BMS-S	BSM-E
A	English dominant	36	1, 2	3, 4, 5
B	Spanish dominant	55	3, 4, 5	1, 2
C	Competent in two languages	62	3, 4, 5	3, 4, 5

The sparsity of English-dominant subjects is not altogether surprising considering that the sample was drawn from children identified as Spanish-speaking or Spanish-surnamed in bilingual day care programs.

A 3 X 4 ANOVA was performed for each of the three dependent variables to investigate group-treatment effects. Since it is logical to assume that Spanish-dominant children will perform better with instructions presented in Spanish rather than in English, a significant group by treatment interaction was hypothesized. The main effects for group and treatment were not expected to be significant since language skills per se are not measured by the three dependent variable tests, and since children were assigned to treatments at random.

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Insert Tables 2-4
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Tables 2-4 present the ANOVA results and cell means for the three dependent variable tests.

The group x treatment interaction is not significant for Parecidos; for Mira y Recuerda the interaction is significant at $\alpha = .10$ but not at $\alpha = .05$; for Cuanto y Cuantos the interaction is significant beyond the .05 level. These results reflect the language dependence of the content of the three measures. For the most simple task, Parecidos, the mode of language used for test instructions did not have a significant effect on the scores of most children, regardless of their language competencies. For tests such as Cuanto y Cuantos, heavily laden with verbal instructions, the mode of language used for test instructions did affect the test scores of at least some language competency groups.

An examination of cell means in Tables 2-4 should be tempered by the definition of groups used in this study. For Parecidos the mean for the English dominant, Spanish treatment cell (A4) is noticeably lower and the standard deviation noticeably greater than the other cells. This group includes four children with some limited receptive skills in Spanish as well as one child with absolutely no comprehension of Spanish. The one child with a BSM-S score of 1 in this cell had a Parecidos score of zero. The mean for the four children with BSM-S scores of 2 in this cell had a mean and SD on Parecidos of 17.0 and 7.4 respectively. The (A4) cells of Tables 3 and 4 are also considerably influenced by a single zero score in the cell.

The significant contrasts for Cuanto y Cuantos suggests, as hypothesized, that Spanish-dominant children perform better when instructions are in Spanish and English-dominant children perform better with instructions in English on

tasks with a high content of verbal instructions. The A1-A4 and B1-B4 contrasts are the only pairwise contrasts significant at the .05 level. The cell mean differences for Mira y Recuerda, while not statistically different, show a similar pattern to those for Cuanto y Cuantos. These findings are consistent with previous research involving test translations (Mahakian, 1939) and comparisons of verbal and nonverbal subtests (Christiansen and Livermore, 1970).

For the two language dominant groups, the effects of the combination treatments, treatment 2 and treatment 3, are not nearly so clear. On Cuanto y Cuantos, the treatment combining the dominant language followed by the second language produced mean scores slightly higher than the treatments with dominant language only (cell A2 vs. A1 and B3 vs. B4). This pattern is reversed for the Mira y Recuerda dependent variable. In neither instance are the differences large or statistically significant for the mean scores. The treatments of second language followed by dominant language were consistently lower than the means for the combination of dominant language followed by second language.

For group C (competent in two languages), no significant within group treatment effects were found. The only consistent pattern identified was that mean scores on the combination treatments were higher than mean scores on either of the single language treatments although no consistent discrimination between the two combination treatments is evident. An early reviewer of this study has pointed out that, since these children understand two languages, the repetition of instructions in the combination treatments may be producing higher scores than instructions heard only once in the single language treatments. This is a variable not controlled by the study.

The ANOVA results for Cuanto y Cuantos suggests that students with level 1 or 2 competencies in Spanish are better tested in English than in Spanish. For groups with level 3, 4, or 5 skills in Spanish, testing with instructions in Spanish is appropriate. Since the levels 3, 4, and 5 were combined in the ANOVA, individual level means should be examined to assure that interlevel differences were not disguised by the combination. Table 5 illustrates that the ANOVA groupings were, in fact, appropriate.

Insert Table 5

With the assumption verified that children dominant in Spanish are more appropriately tested in Spanish than in English, the study also sought to compare methods of assessing children's language competency. The four basic sources of information were 1) parents, 2) teachers, 3) the CIRCO Language Check, and 4) the BSM. As noted earlier, the BSM was considered a criterion measures against which other methods were compared.

Seven questions concerning the child's abilities in English and Spanish were asked of parents through a written questionnaire. The five items measuring Spanish usage had an average intercorrelation of $r = .60$. The average correlation between items measuring Spanish usage and items measuring English usage was $r = -.50$.

Seven items, parallel to the items of the parent questionnaire, were used to obtain assessments of children's language from their day care center teachers. The intercorrelation pattern of teacher variables was similar to the

the pattern of parent variables. Correlations among teacher assessments are generally higher than the correlations among parent variables with an average r = 0.64 for the five measures of ability in Spanish and an average r = -0.55 for the correlations between measures of English and measures of Spanish. Table 6 presents the correlations betwen teacher and parent variables. The average of the diagonal elements of the matrix is r = 0.62.

Table 7 presents intercorrelations of test scores from the El CIRCO Language Check and the BSM. The scores from the Language Check include

LC COR = #items answered correctly

LC SPN = #items answered in Spanish

LC ENG = #items answered in English

LC MIX = #items answered in a mixture of Spanish and English

LC NV = #items answered by pointing or gesturing.

In general, the LC MIX and LC NV scores appear to have very little predictive value. The Language Check scores most closely related to the BSM-S scores are SPN (r = .76) and COR (r = .61).

Tables 8 and 9 show correlations between teacher and parent assessment and test results. The item most closely related to BSM-S in these two sets is SPKSPN or responses to "How well does this child speak Spanish?"

The first order correlations presented in Tables 7-9 indicate that the criterion BSM-S can be predicted about equally well from either the CIRCO Language Check or from the use of teacher assessments. Parent assessments have slightly lower correlations with BSM-S.

Insert Tables 6-9

A stepwise regression was used to determine the gain in accuracy of prediction of BSM-S obtained by adding teacher or parent variables to the two scores from the CIRCO Language Check. LC COR and LC SPN were initially forced into the regression equation. Teacher and/or parent variables were then allowed to enter the equation based upon the stepwise criterion. Table 10 illustrates the multiple correlations obtained in this process.

Insert Table 10

Of course, the regression analysis provides a weighted equation for predicting the BSM-S levels, but the use of a regression equation would not be practical for use by examiners with limited training and knowledge. A single criterion score would for this very practical reason be more favorable. Since the SPN score adds significantly to the COR score in predicting BSM-S, a compound cutting score is suggested. Since our purpose is only to separate out the low-scoring (level 1 and 2) children from the population, a two group discriminant analysis is appropriate. The means and standard deviations for LC SPN in Table 11 illustrate almost a complete lack of overlap between the distribution on this variable for the high (level 3, 4, and 5) group and the low (level 1 and 2) group. The LC COR shows considerably more overlap since many level 2 children were able to answer correctly a majority of the 16 items on the Language Check. The joint distributions of SPN and COR scores for the high and low BSM-S score groups were examined to determine an optimal criterion score combination.

A score of 10 or more correct with 4 or more answers in Spanish was found to correctly classify 92% of the sample into high and low BSM-S score groups.

Of the 12 misclassifications, 9 were false negatives; i.e., children with BSM-S scores of 3, 4, or 5 but not identified as Spanish speaking by the CIRCO Language Check.

Discussion

It is always a comfort to the educational researcher when logical assumptions are supported by empirical evidence. This study lends empirical support to the following conclusions:

- Children dominant in Spanish are better tested in Spanish and children dominant in English are better tested in English, particularly on tests with high verbal content.
- The influence of language competency on test scores increases with the quantity of verbal instructions for the test. For tests such as Parecidos with few verbal instructions and simple item types, the influence of language may be minimal.
- Children with level 3 or greater competencies in a language (as defined by the Bilingual Syntax Measure) can probably be validly tested in that language.
- Children with level 2 competencies in a language may be validly tested in that language only if verbal instructions are minimal and test tasks are essentially self-explanatory. However, children with competency level 2 in Spanish and some higher competency in English are generally better tested in English.
- Test instructions in two languages will not significantly affect test scores of children dominant in either language. Dual instructions might be of benefit to children competent in two languages,

however, differences in the present study were not statistically significant and further study of the effects of this methodology for this group is needed.

- Bilingual Syntax Measure scores for competency in Spanish can be predicted from El CIRCO Language Check scores with some accuracy (R = .79).
- The use of teacher questionnaire data can increase the prediction of BSM-S scores from El CIRCO Language Check scores from R = .79 to R = .88.
- The use of parent questionnaire data will not add significantly to the prediction of BSM-S scores from El CIRCO Language Check scores.

This study was designed to serve very specific and practical purposes. The results of the study were valuable in structuring norming procedures for the nonlanguage measures in the El CIRCO battery.

Based upon the ANOVA results and the field experiences of the examiners in the study, a decision was made to give no further consideration to the two combined language treatments for the norming administration of El CIRCO tests. The following results were principal influences on this decision:

A. For the English- and Spanish-dominant groups, the treatment presenting dominant language first was consistently associated with higher mean scores than the treatment with second language first. No one language combination order would be equally appropriate for all children. Therefore, some prescreening of language competencies would be necessary.

B. The differences between the language combination treatments and

dominant language treatments were not large or consistent for any of the groups.

C. The combination treatments were unwieldy and time-consuming to administer.

There is no evidence in the study of any negative effect of dual instructions on test scores. In situations where screening of children's language ability is not used, a combination of instructions may be more appropriate than instructions in only one language. However, if screening is feasible, dual instructions are not likely to increase performance over the use of dominant language instructions alone.

The present study supported the commitment to some prescreening of children's language proficiency before administering the tests in the El CIRCO series. For measures with limited verbal content and appropriate practice exercises, prescreening may not be essential, but for measures with several sets of verbal instuctions and/or verbal content for each item, children's scores could be significantly affected by testing in an inappropriate language.

The EL CIRCO Language Check was adopted as a suitable measure for prescreening and a criterion score of at least 10 correct answers and at least four answers in Spanish was established for use in the norming process. Although only slightly more accurate than parent and teacher information in this study, the EL CIRCO Language Check also offered the administrative advantages of an objective, researcher controlled procedure. A decision was made not to attempt to gather teacher or parent assessments of language competencies for use in addition to the Language Check since these procedures would add significantly to the norming work load, but would not add much to the accuracy of the screening process.

The study also provides an addition to the reliability and validity data for the Bilingual Syntax Measure but some insight as to the relationships within and among teacher, parent, and test assessments of young children's language abilities.

Table 1

Distribution of English and Spanish Proficiencies as Measured by the Bilingual Syntax Measure

	BSM-English					
BSM-Spanish	5	4	3	2	1	Total
5	5	15	13	18	6	67
4	1	7	14	18	8	48
3	1	3	3	5	0	12
2	8	10	4	0	0	22
1	3	7	4	1	0	15
Total	18	42	38	42	14	154

Table 2

Analysis of Variance for Dependent Variable
Parecidos

Factor Group has 3 levels: A (English dominant B (Spanish Dominant)
C (Competent in both languages)

Factor Treatment has 4 levels: 1 (English only) 2 (English-Spanish)
3 (Spanish-English) 4 (Spanish only)

Source	DF	Sum of Squares	F Ratio	P
Group	2	63.65	1.15	0.32
Treatment	3	64.53	0.78	0.51
Error	145	3993.57		
Group x Treatment	6	147.06	0.88	0.51
Error	139	3846.50		

Effect	N	Mean	SD
Total	151	17.35	5.23
A	35	17.51	6.00
B	54	16.46	4.81
C	62	18.03	4.98
1	38	17.65	4.65
2	38	17.73	4.74
3	39	17.82	5.21
4	36	16.11	6.05
A1	12	19.33	4.64
A2	11	17.09	4.71
A3	7	17.85	5.16
A4	5	13.60	9.52
B1	11	17.27	3.30
B2	14	16.71	4.90
B3	13	17.00	4.80
B4	16	15.25	5.36
C1	15	16.60	5.10
C2	13	19.38	4.10
C3	19	18.36	5.43
C4	15	17.86	4.57

Table 3

Cell Means for Dependent Variable
Mira y Recuerda

Factor Group has 3 levels: A (English dominant) B (Spanish dominant)
C (Competent in both languages)

Factor Treatment has 4 levels: 1 (English only) 2 (English-Spanish)
3 (Spanish-English) 4 (Spanish only)

Source	DF	Sum of Squares	F Ratio	P
Group	2	28.41	1.28	0.28
Treatment	3	20.61	0.61	0.60
Error	144	1598.25		
Group x Treatment	6	130.72	2.04	0.06
Error	138	1467.52		

Effect	N	Mean	SD
Total	150	12.86	3.31
A	35	12.88	3.84
B	54	12.29	3.12
C	61	13.36	3.06
1	38	13.13	3.17
2	38	12.73	3.51
3	38	13.31	2.88
4	36	12.25	3.57
A1	12	14.08	3.17
A2	11	13.27	2.41
A3	7	13.00	3.16
A4	5	9.00	5.79
B1	11	11.63	2.77
B2	14	11.42	3.99
B3	13	12.61	2.87
B4	16	13.25	2.25
C1	15	13.46	3.05
C2	13	13.69	3.31
C3	18	13.94	2.63
C4	15	12.26	3.06

Table 4

Analysis of Variance for Dependent Variable
Cuantos y Cuantos

Factor Group has 3 levels: A (English dominant) B (Spanish dominant)
C (Competent in both languages)

Factor Treatment 4 has 4 levels: 1 (English only) 2 (English-Spanish)
3 (Spanish-English) 4 (Spanish only)

Source	DF	Sum of Squares	F Ratio	P
Group	2	338.01	2.71	0.06
Treatment	3	149.30	0.79	0.49
Error	145	9038.87		
Group x Treatment	6	1077.52	3.13	0.00
Error	139	7961.35		

Effect	N	Mean	SD
Total	151	24.44	7.94
A	35	25.85	8.86
B	54	22.46	8.65
C	62	25.37	6.21
1	38	23.50	8.38
2	38	25.89	7.25
3	39	24.76	7.76
4	36	23.55	8.08
A1	12	28.33	6.93
A2	11	29.90	5.66
A3	7	21.57	9.30
A4	5	17.00	9.40
B1	11	17.72	8.95
B2	14	21.85	7.69
B3	13	24.76	7.47
B4	16	24.37	8.75
C1	15	23.86	6.12
C2	13	26.84	5.54
C3	19	25.94	6.97
C4	15	24.86	5.39

Table 5

Comparison of English and Spanish Treatments by BSM-S Proficiency Levels for Dependent Variable Cuanto y Cuantos

	Treatment			
	English		Spanish	
BSM-S Level	$\bar{x}$	SD	$\bar{x}$	SD
2	31.6	2.66	21.2	4.49
3	16.4	9.07	22.3	7.36
4	24.6	7.19	22.2	7.74
5	21.4	7.15	27.1	5.99

Table 6

Correlation Matrix: Teacher/Parent Variables

	P UNDENG	P SPKENG	P UNDSPN	P SPKSPN	P USESPN	P FRDSPN	P HOMSPN
T UNDENG	0.63	0.66	-0.26	-0.38	-0.52	-0.57	-0.41
T SPKENG	0.63	0.65	-0.32	-0.45	-0.58	-0.60	-0.46
T UNDSPN	-0.47	-0.55	0.63	0.68	0.56	0.46	0.63
T SPKSPN	-0.52	-0.54	0.65	0.74	0.63	0.53	0.69
T USESPN	-0.53	-0.52	0.39	0.50	0.56	0.62	0.49
T FRDSPN	-0.56	-0.54	0.33	0.44	0.48	0.52	0.40
T HOMSPN	-0.56	-0.53	0.48	0.57	0.68	0.55	0.64

Table 7

Intercorrelation Matrix: Test Results

	LC COR	LC SPN	LC ENG	LC MIX	LC NV	BSM SPN
LC SPN	0.53					
LC ENG	-0.14	-0.72				
LC MIX	0.20	-0.06	-0.13			
LC NV	-0.18	-0.25	-0.10	-0.14		
BSM SPN	0.61	0.76	-0.51	-0.06	-0.12	
BSM ENG	-0.25	-0.47	0.40	-0.03	0.02	-0.39

Table 8

Correlation Matrix: Teacher Variables/Test Results

	T UNDENG	T SPKENG	T UNDSPN	T SPKSPN	T USESPN	T FRDSPN	T HOMSPN
LC COR	-0.23	-0.24	0.73	0.69	0.37	0.30	0.41
LC SPN	-0.51	-0.53	0.60	0.72	0.65	0.59	0.69
LC ENG	0.42	0.45	-0.29	-0.51	-0.53	-0.49	-0.54
LC MIX	-0.05	-0.04	0.12	0.14	-0.06	-0.04	-0.02
LC NV	0.08	0.06	-0.07	-0.06	-0.08	-0.05	-0.04
BSM SPN	-0.41	-0.47	0.66	0.76	0.64	0.55	0.53
BSM ENG	0.69	0.73	-0.45	-0.51	-0.59	-0.58	-0.58

Table 9

Correlation Matrix: Parent Variables/Test Results

	P UNDENG	P SPKENG	P UNDSPN	P SPKSPN	P USESPN	P FRDSPN	P HOMSPN
LC COR	-0.29	-0.38	0.54	0.55	0.39	0.32	0.42
LC SPN	-0.54	-0.57	0.55	0.61	0.65	0.58	0.64
LC ENG	0.39	0.42	-0.33	-0.46	-0.49	-0.46	-0.47
LC MIX	0.08	0.07	0.12	0.11	-0.05	-0.10	-0.07
LC NV	0.03	0.00	-0.08	0.03	-0.05	-0.01	0.02
BSM SPN	-0.45	-0.51	0.57	0.64	0.53	0.52	0.60
BSM ENG	0.62	0.66	-0.29	-0.38	-0.62	-0.64	-0.51

Table 10

Multiple Correlations for Predicting BSM-S

Predictor Added	Multiple Correlation	Change
LC COR	0.564	
LC SPN	0.793	.229
T SPKSPN	0.866	.073
T USESPN	0.877	.011
T UNDSPN	0.886	.009

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Table 11

Mean Scores on El CIRCO Language Check
for High and Low BSM-S Groups

	No. of Items Correct (COR)			No. of Responses in Spanish (SPN)		
Group	N	$\bar{x}$	SD	N	$\bar{x}$	SD
Low (Levels 1 & 2)	37	9.24	5.63	37	0.86	1.83
High (Levels 3, 4, 5)	117	12.96	3.72	117	8.12	2.75

Footnotes

The research herein reported was sponsored by Contract No. HEW-100-75-0136, Administration for Children, Youth, and Families, U. S. Department of Health, Education and Welfare.